82D CONGRESS
2d Session
HOUSE OF REPRESENTATIVES
DOCUMENT
No. 554

SHEBOYGAN HARBOR, WIS.

LETTER

FROM

THE SECRETARY OF THE ARMY

TRANSMITTING

A LETTER FROM THE CHIEF OF ENGINEERS, UNITED STATES ARMY, DATED JUNE 12, 1952, SUBMITTING A REPORT, TOGETHER WITH ACCOMPANYING PAPERS AND AN ILLUSTRATION, ON A REVIEW OF REPORTS ON SHEBOYGAN HARBOR, WIS., REQUESTED BY THE COMMITTEE ON PUBLIC WORKS, HOUSE OF REPRESENTATIVES, ADOPTED ON OCTOBER 15, 1949

SEPTEMBER 30, 1952.—Referred to the Committee on Public Works and ordered to be printed with one illustration (pursuant to Public Law 504, 82d Cong.)

LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY,
Washington, D. C., August 29, 1952.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEAR MR. SPEAKER: I am transmitting herewith a report dated June 12, 1952, from the Chief of Engineers, United States Army, together with accompanying papers and an illustration, on a review of reports on Sheboygan Harbor, Wis., with a view to determining whether the existing project should be modified in any way at this time, requested by a resolution of the Committee on Public Works, House of Representatives, adopted on October 15, 1949.

In accordance with section 1 of Public Law 14, Seventy-ninth Congress, the views of the State of Wisconsin are set forth in the enclosed communications.

24607—52——1

The Bureau of the Budget advises that there is no objection to the submission of the report to Congress. The complete views of the Bureau of the Budget are contained in the attached copy of its letter.

Sincerely yours,

FRANK PACE, Jr.,
Secretary of the Army.

COMMENTS OF THE GOVERNOR OF WISCONSIN

OFFICE OF THE GOVERNOR,
Madison, Wis., June 4, 1952.

LEWIS A. PICK,
Lieutenant General, Chief of Engineers,
Washington, D. C.

DEAR GENERAL PICK: I have been advised regarding the recommendations of your proposed report, together with the reports of the Board of Engineers for Rivers and Harbors and of the district and division engineers on a review of reports on Sheboygan Harbor, Wis.

A reading of these reports indicates that what is proposed is a very considerable improvement of the harbor, and substantially in accord with the requests of Sheboygan people. I am therefore glad to approve the recommendations of the report and to express the wish that the execution of the proposed improvement be expedited as much as possible.

Sincerely yours,

WALTER J. KOHLER, Jr., *Governor.*

COMMENTS OF THE STATE OF WISCONSIN

THE STATE OF WISCONSIN,
BUREAU OF ENGINEERING,
STATE PLANNING DIVISION,
June 3, 1952.

LEWIS A. PICK,
Lieutenant General, Chief of Engineers,
Department of the Army, Washington, D. C.

DEAR GENERAL PICK: Your proposed report, together with the reports of the Board of Engineers for Rivers and Harbors and of the district and division engineers on a review of reports on Sheboygan Harbor, Wis., forwarded with your letter of May 12, 1952, has been carefully reviewed. My comments and recommendations regarding this report are requested.

As nearly as I am able to ascertain, the recommended improvements will expand Sheboygan Harbor facilities to a very considerable extent and be a great help to shipping into and out of that harbor. It also seems plain that what is proposed is just about what the Sheboygan people and others interested in the harbor have been asking for. My only recommendation is that steps be taken to construct the improvement at the earliest possible date.

Yours very respectfully,

M. W. TORKELSON,
Director of Regional Planning.

REPORT OF THE CHIEF OF ENGINEERS, UNITED STATES ARMY

DEPARTMENT OF THE ARMY,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington 25, D. C., June 12, 1952.

Subject: Sheboygan Harbor, Wis.
To: The Secretary of the Army.

1. I submit herewith for transmission to Congress the report of the Board of Engineers for Rivers and Harbors in response to resolution of the Committee on Public Works of the House of Representatives, adopted October 15, 1949, requesting the Board to review the reports on Sheboygan Harbor, Wis., submitted in House Document No. 475, Sixty-eighth Congress, second session, and subsequent reports, with a view to determining whether the existing project should be modified in any way at this time.

2. After full consideration of the reports secured from the district and division engineers, and after affording local interests full opportunity to be heard, the Board recommends modification of the existing project for Sheboygan Harbor, Wis., to provide for a width of 450 feet at the lakeward end of the entrance channel, extension of the 25-foot channel to a point 700 feet shoreward of the outer end of the north breakwater, depths decreasing from 25 to 21 feet in a farther shoreward distance of 300 feet, extension of the 21-foot project channel upstream to the south side of Maryland Avenue with a general width of about 165 feet and maximum width of 370 feet, and a channel 15 feet deep with general width of 100 feet, extending from the south side of Maryland Avenue to the north side of Jefferson Avenue, with no dredging to be done by the Federal Government within 25 feet of any wharf or bulkhead; generally in accordance with the plan of the district engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable; at an estimated cost to the United States of $199,100 for new work and $8,330 annually for maintenance in addition to that now required; provided that no dredging in the inner harbor shall be accomplished until local interests agree to (*a*) hold and save the United States free from damages due to construction and maintenance of the improvement, and (*b*) make available an adequate area to locate the transfer facilities required for unloading bulk petroleum carriers.

3. After due consideration of these reports, I concur in the views and recommendations of the Board.

LEWIS A. PICK,
Lieutenant General,
Chief of Engineers.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

CORPS OF ENGINEERS, UNITED STATES ARMY,
BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington 25, D. C., April 11, 1952.

Subject: Sheboygan Harbor, Wis.
To: The Chief of Engineers, United States Army.

1. This report is submitted in response to the following resolution adopted October 15, 1949:

Resolved by the Committee on Public Works of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors be, and is hereby, requested to review the reports on Sheboygan Harbor, Wisconsin, submitted in House Document Numbered 475, Sixty-eighth Congress, second session, and subsequent reports, with a view to determining whether the existing project should be modified in any way at this time.

2. Sheboygan Harbor is on the west shore of Lake Michigan, 55 miles north of Milwaukee. It consists of a protected area in the lake and the lower section of Sheboygan River which winds through the city of Sheboygan. The existing Federal project provides for an outer harbor formed by a pier 2,750 feet long extending from the south side of the river mouth into the lake and a shore-connected north breakwater 3,829 feet long converging toward the outer end of the pier; a turning basin 900 feet wide and 20 feet deep in the outer harbor; and an entrance channel 3,500 feet long from deep water in the lake through the south side of the basin to a point about 500 feet within the river, the channel depth being 25 feet from the lakeward end to a point 500 feet shoreward of the outer end of the breakwater, decreasing to 21 feet in the next 300 feet, and continuing at that depth to the end of the improvement. The specific project channel widths are 400 feet at the lakeward end, 500 feet through the turning basin, and 200 feet within the river. However, under the general provisions of the River and Harbor Act of March 4, 1915, a channel width of 450 feet has been provided at the entrance. Costs to the United States, for improvement of the harbor, to October 31, 1950, were $934,600 for new work and $790,800 for maintenance, a total of $1,725,400. The river between the head of the Federal project and Pennsylvania Avenue, mile 1.1, has been dredged by the city, from time to time, to various depths. The last such work, accomplished in 1946, extended to a point 700 feet above Eighth Street at mile 0.66. At present the controlling depth to a point about 1,800 feet above the head of the Federal channel is 18 feet at low-water datum, thence 15 feet in a narrow channel to Eighth Street, and 14 feet for a further distance of 700 feet. Above that point depths are substantially less. At Eighth Street, where the river makes a sharp bend, there is a bascule bridge with horizontal clearance of 99 feet.

3. The city of Sheboygan, a manufacturing center with a population of 42,342 in 1950, is served by railroads and highways. Industries of the city and nearby communities produce principally furniture, vitreous and enameled plumbing supplies, leather goods, woolens, clothing, and processed dairy products. The principal terminal occupies the right bank between Eighth Street and the river mouth. It is privately owned and is used primarily as an unloading point for coal and china clay. On the opposite bank of this section of the river

are two small coal-receiving terminals, fish wharves, and a municipal wharf now devoted to activities of the United States Naval Reserve. A large crude-oil refinery and a public-utility power plant are near the city. Coal for the latter is received by water at Sheboygan Harbor. In recent years the commodity commerce of the harbor, all receipts, has been limited to the section below Eighth Street. It averaged 552,526 tons annually during the 10 years from 1941 through 1950. In 1950 it consisted of 627,563 tons of coal, 11,243 tons of ball and china clay, 1,908 tons of material used in the harbor improvement, and 460 tons of fish—a total of 641,174 tons. Vessel traffic in 1950 included 70 round trips by steamers and motor vessels drawing 10 to 22 feet, 2 round trips by barges, and 1,293 round trips by fishing boats with drafts of 6 feet and less. Recreational craft use the harbor as far upstream as Pennsylvania Avenue.

4. Local interests desire extension of the 21-foot Federal channel to Maryland Avenue, about 700 feet above Eighth Street, and provision of a channel 15 feet deep to the north side of Jefferson Avenue. The Lake Carriers' Association advocates increasing the project depths in the entrance channel from 25 and 21 feet to 28 and 23 feet, respectively. In support of this proposal it cites a trend toward use of larger vessels on the Great Lakes, the possibility that lake levels will be below the established low-water datum plane, and conditions at the harbor entrance which frequently cause a vessel to roll and pitch. Local interests contend that extension of the Federal channel is needed for the receipt of limestone, lumber, crude oil, and china clays at locations above Eighth Street. City officials indicate that suitable requirements of local cooperation will be met.

5. The district engineer presents a three-part plan for further improvement. Part A contemplates extending the existing project channel upstream about 3,700 feet to Maryland Avenue to provide a depth of 21 feet. The general width of the channel would be about 165 feet and the maximum width 370 feet. The district engineer estimates the construction cost for this work at $121,000 to the United States for dredging and $75,000 to the city for altering a water main. Annual carrying charges, including $6,300 for Federal maintenance, are estimated at $14,200. The district engineer points out that the lower part of the extension will preserve the channel dredging accomplished by local interests in 1946 along the coal-receiving frontage and that the upper part will afford a deeper substitute for the channel 19 feet deep which local interests previously maintained to the vicinity of Eighth Street. He evaluates the annual benefits at $25,500 consisting of $20,700 for saving of costs in the receipt of 168,000 tons of crude oil by allowing tankers to be fully loaded on the 21-foot channel rather than partially loaded on a 19-foot channel, and of $4,800 for a similar saving on the prospective receipt of 100,000 tons of crushed limestone. The benefit-cost ratio for part A is 1.8. Part B consists of a proposed channel 15 feet deep and generally 100 feet wide extending from Maryland Avenue upstream about 1,300 feet to the north side of Jefferson Avenue. The costs, all Federal, are estimated by the district engineer at $50,600 for construction and $2,030 annually for maintenance. Annual carrying charges are estimated at $4,000. This part of the plan would provide a channel for a prospective movement of 12,000 tons of lumber annually by water directly to the vicinity of furniture factories thus saving extra charges for handling

and land transportation which would be entailed if the lumber is unloaded in the lower part of the harbor. The district engineer estimates this saving at $12,000 annually. The benefit-cost ratio for part B is 3.0. Part C of the plan contemplates deepening the entrance channel to 25 feet for a distance of 200 feet shoreward of the inner end of the existing 25-foot channel, moving the transition section between the 25- and 21-foot sections shoreward 200 feet, and incorporating in the project a specific provision for a channel width of 450 feet at the harbor entrance. The district engineer estimates the cost of this work to the United States at $27,500 for construction and no additional maintenance. The annual carrying charges would be $1,070. He finds this work justified by the added safety for vessels. Estimated costs to the United States for the complete plan are $199,100 for construction and $8,330 annually for additional maintenance. The benefit-cost ratio is 1.9. The district engineer recommends modification of the existing project to provide for improvement in accordance with his complete plan, accomplishment of the work within the river to be subject to the condition that local interests furnish assurances that they will hold the United States free from resulting property damages, making necessary changes in the existing water main, and make available an adequate area to locate transfer facilities required for unloading petroleum carriers.

6. Local interests were informed of the recommendations of the reporting officers. They also were notified that the Board of Engineers for Rivers and Harbors, from the information presented, was not convinced of the advisability of the United States undertaking the improvement because the narrow, tortuous river is not adequate to contain suitable harbor facilities for large vessels, particularly in the vicinity of the Eighth Street Bridge, and the available evidence does not indicate that the resulting benefits would justify the expenditures required. At a public hearing, held by the Board in Washington, D. C., upon their request, local interests presented additional statements favorable to the proposed improvement. Representatives of several industries and civic interests pointed out the inadequacies of the existing harbor and stressed the need for further improvement to afford access to additional terminal sites along the river. In addition to savings in transportation costs on commerce in crude oil, lumber, and limestone, they claimed that benefits would accrue in connection with the repair and maintenance of vessels and the shipment of scrap metals.

VIEWS AND RECOMMENDATIONS OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS

7. After further consideration of the reports of the district and division engineers and the additional information submitted by local interests, the Board of Engineers for Rivers and Harbors is of the opinion that the improvement of Sheboygan Harbor is advisable. Prospective general benefits appear sufficient to warrant the extension of the river channel as a part of the Federal project. Enlargement of the entrance channel is needed for the safety and convenience of established navigation.

8. Accordingly, the Board recommends modification of the existing project for Sheboygan Harbor, Wis., to provide for a width of 450 feet at the lakeward end of the entrance channel, extension of the 25-foot

channel to a point 700 feet shoreward of the outer end of the north breakwater, depths decreasing from 25 to 21 feet in a farther shoreward distance of 300 feet, extension of the 21-foot project channel upstream to the south side of Maryland Avenue with a general width of about 165 feet and maximum width of 370 feet, and a channel 15 feet deep with general width of 100 feet, extending from the south side of Maryland Avenue to the north side of Jefferson Avenue, with no dredging to be done by the Federal Government within 25 feet of any wharf or bulkhead; generally in accordance with the plan of the district engineer and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable; at an estimated cost to the United States of $199,100 for new work and $8,330 annually for maintenance in addition to that now required; provided that no dredging in the inner harbor shall be accomplished until local interests agree to (*a*) hold and save the United States free from damages due to construction and maintenance of the improvement, and (*b*) make available an adequate area to locate the transfer facilities required for unloading bulk petroleum carriers.

For the Board:

G. J. Nold,
Major General, Chairman.

REPORT OF THE DISTRICT ENGINEER

SYLLABUS

Local interests requested consideration of a deeper harbor entrance with increased depth in the channel through the outer harbor; also extending the deeper channel about 1,000 feet up river from the existing harbor channel and thence a 21-foot channel to Pennsylvania Avenue Bridge. The district engineer reports that there is need and justification for some increase in depth at the harbor entrance but increased channel depth through the outer harbor is not warranted. He finds also that there is need and economic justification for extending the existing project depth of 21 feet up river for about a block above Eighth Street and thence a channel of 15 feet depth to a block below Pennsylvania Avenue. He recommends modification of the existing project to provide for extending the existing channel about two-thirds mile upriver at 21 feet depth and thence at 15 feet depth for about an additional one-fourth mile, at a total estimated first cost of $171,600 to the United States with $8,330 increase in the annual cost of maintenance, subject to prior compliance with certain conditions of local cooperation. He further recommends some minor widening and deepening at the harbor entrance to make navigation free and safe, at an estimated first cost of $27,500 to the United States, with no increase in the cost of maintenance.

Corps of Engineers, United States Army,
Office of the District Engineer,
Milwaukee District
Milwaukee 1, Wis., December 8, 1950.

Subject: Review Report on Surveys of Sheboygan Harbor, Wis.
To: Division Engineer, Great Lakes Division, Corps of Engineers, United States Army, Chicago 15, Ill.

AUTHORITY

1. This review report of survey scope is submitted in compliance with the following resolution adopted October 15, 1949:

Resolved by the Committee on Public Works of the House of Representatives, United States, That the Board of Engineers for Rivers and Harbors be, and is hereby,

requested to review the reports on Sheboygan Harbor, Wisconsin, submitted in House Document Numbered 475, Sixty-eighth Congress, second session, and subsequent reports, with a view to determining whether the existing project should be modified in any way at this time.

NATURE OF REPORTS BEING REVIEWED

2. House Document No. 475, Sixty-eighth Congress, second session, contains preliminary examination and survey reports unfavorable to the construction of a south breakwater but favorable to providing a turning basin 900 feet wide and 20 feet deep in the outer harbor and an entrance channel of the same depth along the south pier varying from that depth to 22 feet at the harbor entrance, the depths being referred to the then existing low-water datum of 579.6 feet above mean tide at New York. These recommended modifications of the project were authorized by River and Harbor Act approved January 21, 1927.

3. Rivers and Harbors Committee Document No. 47, Seventy-fourth Congress, first session, contains a review report favorable to providing an entrance channel having a depth of 25 feet from its lakeward end to a point 500 feet shoreward of the breakwater end, thence decreasing to 21 feet in a channel 500 feet wide along the south side of the turning basin to the river mouth. These recommended modifications of the project were authorized by River and Harbor Act approved August 30, 1935.

SCOPE OF SURVEY

4. This report and the accompanying map were prepared from maps, borings and other data on file in this office, supplemented by instrumental field survey, including soundings, borings and topography, sufficient to show present conditions. The Lake Carriers' Association, vessel interests using the harbor, local and other interested parties were advised of the nature of this report, its conclusions and the proposed recommendations by this office, as indicated in paragraphs 54 and 60 below.

DESCRIPTION

5. Sheboygan Harbor is located at the city of Sheboygan on the west shore of Lake Michigan at the mouth of Sheboygan River, which is about 55 miles northerly from Milwaukee Harbor, Wis., and about 73 miles southerly from the Lake Michigan entrance of the Sturgeon Bay and Lake Michigan Ship Canal, Wis. The nearest improved harbors are at Manitowoc, Wis., about 26 miles to the north, and at Port Washington, Wis., about 29 miles to the south. The commercial harbor is located largely below Eighth Street Bridge in the lower two-thirds mile of the Sheboygan River, with some recreational-craft traffic extending up to about Pennsylvania Avenue Bridge, about 1.1 miles above the mouth of the river. The available depths are 25 feet at the harbor entrance and 21 feet in the entrance channel through the outer basin to the upstream end of the Federal project, thence 18 feet in the next one-third mile, thence 15 feet in the narrow channel to Eighth Street Bridge, at 0.66 mile above the river mouth. There are 14 feet available in a narrow channel for about 700 feet upstream from Eighth Street, thence 7 feet in about the next 700 feet and then only 5 feet in the remaining approximate 1,000 feet to Pennsylvania Avenue

Bridge. In the next 0.43 mile to the fixed railroad bridge the controlling depth is only about 3.5 feet below datum. Only small boats of the rowboat and outboard-motor type can use the river above Pennsylvania Avenue to the fixed railway bridge at the head of navigation at about 2.4 miles from the mouth of the river. The city has dredged the river to various depths from time to time from the upper limit of the Federal project to Pennsylvania Avenue, a distance of about 1 mile. The last such dredging was done in 1946 and provided controlling depths above the existing project of 22 feet for a distance of about 1,600 feet; thence decreasing to 16 feet at New Jersey Avenue and continuing to Eighth Street Bridge and thence from Eighth Street Bridge 14 feet in a narrow channel in the center of the river for a further distance of about 700 feet. The general location of Sheboygan Harbor and its relation to other ports is shown on United States Lake Survey Charts Nos. 7 and 735 and on the map accompanying this report.

6. Except as otherwise stated, the depths mentioned in this report are referred to low-water datum for Lake Michigan, which is 578.5 feet above mean tide at New York. Since 1900 the fluctuations of water level on Lake Michigan, as measured by monthly means, have ranged from about 1 foot below to 4 feet above datum. The greatest annual fluctuations shown by the highest and lowest monthly means of any year was about 2 feet and the least annual change was about one-half foot. Lake Michigan is nontidal but winds and variations in barometric pressures produce temporary changes in lake level ranging from a few inches to several feet above or below the normal level prevailing at the time. The fluctuations of water level at Sheboygan Harbor are about the same as those which apply to other harbors on Lake Michigan.

7. Local interests have not donated any land or funds toward Federal improvement of the harbor and have not made any improvements to the harbor under prescribed conditions of local cooperation. No additional aids to navigation would be needed for the work considered in this report. Therefore, the subjects of local cooperation on existing and prior projects and of aids to navigation are not involved in this report.

TRIBUTARY AREA

8. The 1950 population of the city of Sheboygan was 42,342. It is the county seat of Sheboygan County, which has an area of about 521 square miles and had a total population of 76,221 in 1940. The present population is estimated at 80,000. Practically all of the county is in the trading area of the city and is a well-developed dairy-farming area. The city has six banks with total resources of about $76,000,000. It is primarily a manufacturing center with about 125 manufacturing and industrial establishments. The principal manufactures are furniture, leather, shoes, clothing, and the processing of dairy products. These plants ordinarily employ about 8,150 persons and their annual products are valued at about $43,000,000. Their products are distributed widely throughout the country by rail and truck. There also are large distributors of coal, building materials, and foodstuffs, who distribute their supplies by rail and truck in that general locality and to distant points. A large crude-oil refining plant

located just southwest of the city commenced operations in January 1941. Since then it has processed an average of about 1,000,000 barrels of crude oil per year. The Edgewater power station of the Wisconsin Power & Light Co. is located along the lake shore 2¼ miles south of the harbor entrance.

9. The village of Kohler, with a population of 1,798 in 1940 and located about 4 miles west of Sheboygan, produces large quantities of vitreous and enameled plumbing supplies and automatic electric-lighting plants for domestic and foreign trade. Sheboygan Falls, with a population of 3,395 in 1940 and located about 5 miles southwesterly from Sheboygan, is largely a manufacturing town with a large woolen mill, a tannery, toy, chair, and cheese factories, and a flour mill. Plymouth, with a population of 4,170 in 1940 and located 18 miles west of Sheboygan, is in a large agricultural area devoted largely to the making of cheese. The 1940 populations of other smaller towns within the tributary farming area are Cedar Grove, 907; Oostburg, 742; and Elkhart Lake, 571, the latter being largely a summer resort community.

10. Sheboygan is served by the Ashland division of the Chicago & North Western Railway and a branch line of the same railway running west to Fond du Lac through Sheboygan Falls and Plymouth. These lines provide convenient connections with the other major railway systems of Wisconsin and other States. The city also is served by a network of improved Federal and State highways to all of the principal communities in the tributary area and to the larger centers of population. Motor bus and truck services are available to all principal surrounding points.

BRIDGES

11. There are no bridges over that portion of the river improved by the United States. There are three movable and one fixed bridge over the remainder of the river below the fixed railway bridge at the nominal head of navigation about 2.4 miles upstream from the mouth of the river. Table 1 shows the locations, dimensions, and other pertinent data for these bridges, the plans for all of which were approved by the War Department.

TABLE 1.—*Bridges*

No.	Location		Owner and use	Draw openings clear width	Clear height above low water datum
	Name	Miles above river mouth			
				Feet	*Feet*
1	8th St	0.66	City; highway	[1] 99	10.8
2	Pennsylvania Ave	1.14	do	[1] 68.5	18.7
3	Chicago & North Western Ry	1.57	Chicago & North Western Ry.	[2] 60	20.0
4	14th St	1.65	City; highway	[1] 54	[3] 14.3

[1] Bascule; center opening.
[2] Former swing span converted to fixed bridge at 13th St., with 60-foot clear opening either side of center pier.
[3] Seldom opened.

PRIOR REPORTS

12. Nine prior reports have been submitted for this harbor; the three most recently submitted are listed in table 2.

TABLE 2.—*Prior reports*

Document containing report	Date submitted to Congress by Secretary of the Army	Recommendations
H. Doc. No. 475, 68th Cong., 2d sess	Dec. 2, 1924	Favorable survey report. Its nature and content are described in par. 2 above.
Unpublished	Jan. 2, 1935[1]	Review report unfavorable to the construction of a south breakwater to protect piers and slip then proposed to be built by the city in the river near its mouth and along the lake front south of the existing harbor entrance channel.
House Committee on Rivers and Harbors Doc. No. 47, 74th Cong., 1st sess.	May 24, 1935[1]	Favorable review report. Its nature and content are discussed in par. 2 above.

[1] Submitted by the Chief of Engineers, U. S. Army.

EXISTING CORPS OF ENGINEERS' PROJECT

13. After various unsuccessful attempts to operate boats between the lake and the river in their natural conditions, the county appropriated $20,000 and the village $10,000 for improvement at the mouth of the river which was commenced in 1852. These private funds were supplemented by $10,000 appropriated by River and Harbor Act approved August 30, 1852. An additional $10,000 from the lump sum, River and Harbor Act of June 28, 1864, was also applied in 1865 to provide extensions about 128 and 64 linear feet in length to the private north and south piers, respectively. The original Federal project for improvement of this harbor was adopted by the River and Harbor Act of June 23, 1866, and was modified later by five River and Harbor Acts during the period from March 3, 1873, through June 13, 1902. Subsequent River and Harbor Acts of March 2, 1907, January 21, 1927, and August 30, 1935, provided for the north breakwater, the turning basin and present project dimensions.

14. The existing project provides for an outer harbor or stilling basin formed by a breakwater extending from the shore about 2,100 feet north of the remaining 456 feet of the pier and revetment on the north side of the channel at the mouth of the Sheboygan River for a total length of 3,829 feet, and a south pier 2,750 feet long extending into the lake about normal to the shore on the south side of the mouth of the river, and for a turning basin 900 feet wide and 20 feet deep in the outer harbor with an entrance channel about 3,500 feet long through the south side of the basin, the depth being 25 feet from the lakeward end to a point 500 feet shoreward of the end of the north breakwater, decreasing to 21 feet in the next 300 feet and continuing at the latter depth to the inner end of the improved channel, the widths to be 400 feet at the lakeward end and 500 feet through the turning basin, decreasing to 200 feet at the river mouth.

15. The existing project was completed in 1938. The north breakwater was completed in 1915, the south pier in 1904, and the dredging

in 1938. The total cost of permanent work on all projects, to and including October 31, 1950, is shown in table 3.

TABLE 3.—*Cost of previous and existing projects*

Project	New work	Maintenance	Total
Previous projects	$487,800	$87,100	$574,900
Existing project	446,800	703,700	1,150,500
Total	934,600	790,800	1,725,400

The latest (1948) approved estimate of annual cost of maintenance is $30,000. The average cost of annual maintenance during the last 5 years has been only about 70 percent of the latest estimated annual cost on account of curtailment due to the war and subsequent lack of funds. There are no recommended changes in the project pending before Congress.

OTHER IMPROVEMENTS

16. In 1841–48 private interests built "bridge piers" about 800 feet long out to about a 10-foot depth in Lake Michigan on either side of the natural mouth of the river. Their usefulness decreased with improvement of the harbor in the river and all such piers were abandoned in 1874. During the years 1852–65 the private and the donated Federal funds noted above in paragraph 13 were used to construct parallel entrance piers about 175 feet apart and about 1,000 feet long on each side of the river mouth, and to improve a channel between them by dredging to about 10-foot actual depth of water. After the Federal project was adopted in 1866 the city continued to provide and operate the harbor lights until 1873, when the United States erected lights on the then pierheads and thereafter assumed the responsibility of lighting to aid navigation at the harbor. The city is reported to have expended, prior to 1912, additional amounts of about $75,000 for dredging the river for about 1½ miles above its mouth and about $25,000 for docking street ends. Private parties are reported to have expended during the same period more than $200,000 for revetting about 1⅔ miles of river frontage downstream from Fourteenth Street. These private revetments, or docks, were provided for use in the shipment of substantial amounts of grain, other agricultural products and local manufactured products; also for the receipt of large amounts of coal, lumber, tan bark, other forest products, and miscellaneous merchandise. City officials report that the city, since 1912, has spent about $160,000 for dredging the river. Most of the work in relatively recent years was below Eighth Street Bridge and the last dredging was done in 1946. At the present time the entire 5,650 linear feet of frontage along the right bank of the river below Pennsylvania Avenue Bridge, which includes 350 linear feet of street ends, is revetted with substantial structures in generally good condition. The entire 3,700 linear feet of frontage along the left side of the river from 700 feet upstream from Eighth Street Bridge, which includes 450 linear feet of street ends and about 420 linear feet of municipal-wharf frontage just downstream from Eighth Street, also is revetted with substantial structures in generally good to fair condition. The city provided this municipal wharf in 1923 with warehouse, electric railway, and street

connections at a cost of about $40,000. About 340 feet of the west end of this frontage was recently repaired with steel-sheet-pile revetment and the remainder of the frontage, plus an adjoining 180 feet of street ends, is to be revetted with steel-sheet piling in the near future as a matter of maintenance. This 600 feet of municipal wharf and frontage is now used by the United States Naval Reserve for moorage and training purposes.

TERMINAL AND TRANSFER FACILITIES

17. The C. Reiss Coal Co. operates the principal water terminal, which is along the right side of the river and extends about 3,200 linear feet upstream from the river mouth to Eighth Street Bridge. The lakeward 1,300 feet of this dock is used for the receipt, storage, and reshipment of coal. It is equipped with a 12-ton electric traveling bridge crane and appropriate power-driven yard-handling equipment. It has a storage capacity for 70,000 tons of anthracite and 350,000 tons of bituminous coal and has railway and highway connections. About 206,000 tons of the coal receipts over this dock are reshipped annually by rail to the Edgewater power station of the Wisconsin Power & Light Co. An enlargement of this power plant now in progress will require an estimated annual increase of about 170,000 tons in coal receipts and shipments at this coal dock on and after about January 1, 1951. During the years 1932–41 and again in 1949 after the war about 3,000 to 14,000 tons of ball and china clay, averaging about 7,000 tons per year, were received over this terminal above the first bend in the river via foreign vessels having a draft of about 14 feet for direct reloading and reshipment to the plumbing manufacturing plant at Kohler, Wis. During the years 1935–41 about 5,000 to 23,000 tons of molders sand, averaging about 13,500 tons annually, also was received over this dock via the large, deep-draft vessels of the Reiss Steamship Co. for reshipment to the plumbing plant at Kohler.

18. The Sheboygan Coal Co. operates a coal dock on the west side of the river opposite the main harbor entrance channel. This dock has about 500-foot frontage, a storage capacity of about 25,000 tons of bituminous coal and coke, and about 5,000 tons of anthracite. It has highway connections only and all coal must be delivered by self-unloader vessels. The Hildebrand Lumber & Supply Co. handles bituminous coal with self-unloader vessels over about 500-foot frontage along the north side of the river west of the United States Coast Guard Station. The wharf has a storage capacity of about 8,000 tons and has only highway connections for distribution for local trade.

19. The C. Reiss Coal Co. owns about 370 feet of improved frontage along the south side of the river between Eighth and Ninth Streets. This frontage is not in commercial use at present. When and if a depth of 21 feet is provided in the river for such large, deep-draft carriers of the Reiss fleet as can pass through Eighth Street Bridge, the owner proposes to use this frontage for the receipt and storage of crushed stone and agricultural meal from the Reiss limestone quarries on Drummond Island, Mich.

20. The Sheboygan Yacht Club owns about 190 feet of improved right-bank river frontage just above Ninth Street and uses about two-thirds of it for the winter storage and repair of most of its boats.

The club also owns a clubhouse at the lake front with a pier extending into the outer harbor. The 240 feet of frontage between the yacht-club property and the north side of Maryland Avenue is not used for vessel-freight traffic. It has such a limited width available between the building and revetment that it would be of relatively little value as wharfage. The contiguous 730 feet of right-bank frontage upstream to Virginia Avenue has an improved dock and a large, modern warehouse for the storage and seasoning of lumber for the manufacture of furniture in the large adjacent RWAY Furniture Co. plant. The company plans to use this frontage for the receipt of lumber by vessel as soon as an adequate channel is available. The adjoining upstream 320 feet of improved dock frontage between Virginia and Jefferson Avenues also is to be used for the receipt of lumber as soon as an adequate channel is available. A width of about 135 feet shoreward of this river frontage is available for storage of lumber for nearby chair- and furniture-manufacturing plants, or for other purposes. The 320 feet of improved dock frontage in the adjoining block to Pennsylvania Avenue Bridge is utilized in large part for refueling such recreational craft as can get that far up the river. It also could be used for the receipt and storage of lumber, or for other marine purposes, if an adequate channel were available. About 700 feet of improved frontage along the left bank of the river between Maryland and Virginia Avenues below Eighth Street is used by most of the fishermen operating at this harbor. The left side of the river between Pennsylvania Avenue and Eighth Street is largely a steep bank not conveniently available for commercial use. Only 700 feet of it upstream from Eighth Street is improved but it is not of much value for commercial purposes. The above-described used and unused frontage is considered adequate for present and reasonably prospective commerce of this port, if adequate channels are provided to presently unused frontage to such extent as may be economically justified. However, local interests should assure that adequate transfer facilities for crude oil are available.

IMPROVEMENTS DESIRED

21. A public hearing was held in the City Hall at Sheboygan by the district engineer on December 14, 1949. About 85 persons were present, including the mayor, aldermen, and other city of Sheboygan officials, the executive officer of the Wisconsin State Planning Board, representatives of the local association of commerce and the junior chamber of commerce, the harbor and bridges committee of the common council, various water-frontage owners and marine and other business concerns interested in further improvement of the harbor, the United States Naval Reserve, the Yacht Club, the Wisconsin Telephone Co., the railroads, and various other local business interests and residents. The desired improvements and the reasons therefor were generally described in written statements presented at the hearing, including communications received from the Lake Carriers' Association, the United States Congressman from the Sixth District and the State conservation department. The stenographic report [1] of the hearing, including related papers, accompanies this report.

[1] Not printed.

22. The mayor and city attorney presented a joint written statement for and on behalf of the city of Sheboygan, requesting the following improvements of the harbor:

(*a*) Deepen the entrance area from the existing depth to 28 feet.

(*b*) Deepen the inside channel from the existing 21-foot depth to 23 feet.

(*c*) Extend the present project from its present terminus by the construction of a channel up the Sheboygan River to the Pennsylvania Avenue Bridge, at a depth for the first 1,000 feet of such extension of 23 feet and the balance of the extension at a depth of 21 feet.

23. Substantially the same improvements were requested in the written statements presented by the Lake Carriers' Association and the C. Reiss Coal Co., all of which were indorsed generally in whole or in part by written statements submitted by various local business concerns desirous of obtaining water transportation and also by recreational craft interests.

24. The principal reasons advanced to justify the requested changes in the existing project are summarized below:

(*a*) Increased depths in the outer harbor entrance and inner channels are needed for the ever-increasing size and draft of vessels on the Great Lakes; none less than 600 feet long having been built in the past 25 years.

(*b*) Another reason for increased depth of available water in Sheboygan Harbor is that the general water level in the Lakes is in a decreasing cycle and that such a condition will continue for some time.

(*c*) There are conditions at the entrance to Sheboygan Harbor that frequently cause a vessel to roll and pitch when entering the channel so the only safeguard in such conditions is more water under the keel. Although few harbors on the Great Lakes have 28 feet of water available, the conditions at Sheboygan are said to be such as to justify that depth.

(*d*) Increased depth in the entrance channel is more obviously needed now than in 1935 because of the large number of deeper draft boats now in service on the Great Lakes.

(e) A 21-foot channel up the river is needed for the annual transport of new water-borne commerce, estimated to be 100,000 tons or more of high magnesium content stone for agricultural and construction uses from Drummond Island, Chippewa County, Mich., to the dock just above the Eighth Street Bridge. A further new water-borne commerce consisting of approximately 300,000 tons or more of crude oil for the local refinery would be delivered by tankers using the lower portion of a 21-foot channel below the Eighth Street Bridge.

(*f*) The practical depletion of the nearby lumber supply for the manufacture of furniture and the prevailing high rail rates from sources in Canada warrants a channel up to Pennyslvania Avenue for the delivery of about 12,000 tons of lumber and logs annually by vessel from Canada to the furniture-manufacturing plants and yards along the river. An annual average of about 12,000 gross tons of china clay and ball clay imported from England for the manufacture of vitreous china plumbing fixtures, ordinarily received over the Reiss coal wharf, would use such a channel in

order to improve cleanliness conditions for transfer from vessel to truck and to shorten the truck hauls to Kohler, where the material is used.

(*g*) Maximum cooperation was offered in securing rights-of-way without expense to the United States and in obtaining releases holding the Federal Government free from any liability for damages resulting from the improvement work.

COMMERCE

25. Table 4 shows the annual amount of water-borne commerce of the harbor for the calendar years 1940 to 1949, inclusive, including passenger traffic.

TABLE 4.—*Comparative statement of traffic*

Calendar year	Vessel arrivals [1]		Receipts [2]									
	Number	Net registered tonnage	Ball and china clay [3]	Coal		Coke	Sand, molders	Fish, fresh [4]	Stone, rubble [5]	Total	Passengers arrived and departed
				Anthracite	Bituminous						
1940	1,458	302,264	13,877	22,554	394,560	3,909	18,218	173	2,544	455,835	900
1941	1,572	316,906	3,255	23,906	481,147	-------	22,902	189	-------	531,399	471
1942	1,168	317,663	-------	30,034	522,351	1,115	7,402	188	1,966	563,056	--------
1943	1,043	251,625	-------	29,854	411,953	-------	--------	206	2,852	444,865	--------
1944	1,392	303,726	-------	35,043	512,246	1,808	--------	291	991	550,379	--------
1945	1,547	341,738	-------	40,043	562,858	1,665	--------	313	991	605,870	3,468
1946	2,713	330,062	-------	28,089	539,493	-------	--------	348	-------	567,930	--------
1947	1,571	286,253	-------	26,569	499,630	-------	--------	239	[6] 2,273	528,711	--------
1948	1,531	355,014	1,630	24,239	632,524	-------	--------	252	991	659,636	1,123
1949	1,179	245,210	7,533	16,862	407,512	-------	--------	332	-------	432,239	--------
Annual average	1,517	305,046	[7] 6,574	27,719	496,427	[7] 2,124	[7] 16,174	253	[7] 1,801	533,992	[7] 1,491

[1] Departures the same; includes local commercial fishing vessels which averaged about 1,448 trips per year for 1940–49.
[2] Short tons of 2,000 pounds, including small amount of coal taken on Government plant. (See note 6.)
[3] Foreign from England.
[4] Local catch.
[5] Government riprap stone, except as otherwise noted.
[6] Includes 300 tons of bituminous coal taken on Government plant for winter supply.
[7] Average is based on only the years for which there were receipts.

26. During the years 1940–49 the freight traffic of this port has varied from a minimum of 432,239 tons in 1949 to a maximum of 659,636 tons in 1948, the annual average during the period having been 533,992 tons. The substantial business in molders sand was discontinued during the war and has not been resumed. However, the importation of china and ball clay from England prior to the war, which was interrupted during the hostilities, was resumed in 1948, and in 1949 it amounted to a little more than the prior average annual business. These clays are reshipped to the nearby village of Kohler for use in the manufacture of large quantities of plumbing fixtures. None of the finished products has been shipped via the harbor since the coastwise package freight business was discontinued in 1934. The passenger business shown in table 4 is that resulting from occasional large excursion boats stopping at this port as part of recreational trips.

27. The distribution of commerce[1] for 1949 between the existing terminals is shown on a flow chart accompanying this report. The commerce for 1949 is reasonably representative of its relatively recent and present character but expansions of both character and amount of commerce are planned by local interests for the near future. Coal constitutes about 98 percent of the present traffic of the harbor. Although the general tendency of that business is somewhat downward under present competitive conditions, a new generator unit now being added to the Edgewater power station of the Wisconsin Power & Light Co., about 2¼ miles south of Sheboygan Harbor, will require the average annual delivery of about an additional 170,000 tons of coal via the harbor, starting early in 1951. The Wisconsin Oil Refining Co. proposes to install additional storage tanks and a pipeline for the receipt of large amounts of crude oil by tanker via the harbor for refining at that company's plant located about one-half mile south of the southwesterly city limits. The company's large crude-oil-refining plant commenced operations in 1941. Since that time it has processed an average of about 1,000,000 barrels or 168,000 tons of crude oil per year. Up to date the oil has been delivered to the plant by rail but delivery by vessels is proposed for 1951 by using an existing wharf at the harbor and pumping through a pipeline from the harbor to the plant. The C. Reiss Coal Co. also proposes to bring into the harbor by vessel from their Drummond Island quarries about 100,000 tons annually of high magnesium content crushed limestone for construction purposes and agricultural meal for fertilizer. Various furniture-manufacturing plants along the Sheboygan River propose to receive about 12,000 tons annually of lumber by vessels from Canada as soon as an adequate channel is available.

VESSEL TRAFFIC

28. Table 5 shows the trips and drafts of vessels using Sheboygan Harbor in 1949, except for recreational craft.

TABLE 5.—*Trips and drafts of vessels in 1949*

Draft (feet)	In-bound				Out-bound			
	Steamers	Motor vessels	Motor vessels, fishing	Total	Steamers	Motor vessels	Motor vessels, fishing	Total
20 to 22	20			20				
18 to 20	21			21				
16 to 18	2			2	30			30
14 to 16	3			3	15			15
12 to 14	1			1	1			1
Less than 12		2	1,130	1,132	1	2	1,130	1,133
Total	47	2	1,130	1,179	47	2	1,130	1,179
Total net registered tonnage	220,543	70	24,597	245,210	220,543	70	24,597	245,210

The above includes four steamers, foreign registered, total net registered tonnage 3,536.

29. The commercial freight and fishing vessels using this harbor in 1949 are shown in table 6.

[1] Not printed.

TABLE 6.—*Commercial freight and fishing vessels using Sheboygan Harbor in 1949*

Name of vessel	Service	Number of trips	Total net registered tonnage	Over-all length	Over-all breadth	Average draft	
						Loaded	Light
STEAMERS				*Feet*	*Feet*	*Feet*	*Feet*
John P. Reiss	Coal	6	29,778	529.0	54.0	20.1	16.0
Peter Reiss	do	2	10,136	529.0	54.2	19.3	16.0
Peter Reiss	Fueling	1	5,068	529.0	54.2	16.0	16.0
Reiss Brothers	Coal	5	31,845	613.0	60.3	20.2	16.0
Clemens A. Reiss	do	9	30,303	457.5	50.2	19.3	15.0
William A. Reiss	do	6	39,318	617.0	62.0	19.7	16.0
Otto M. Reiss	do	1	3,358	450.0	52.2	19.0	15.0
A. M. Byers	do	5	24,205	529.0	54.0	20.7	16.0
Joseph Morrow	do	1	3,470	450.0	52.0	18.0	15.0
Charles C. West	do	1	6,840	590.1	60.1	19.0	16.0
T. W. Robinson	do	1	6,118	585.0	60.2	17.4	15.0
Thomas Walters	do	2	11,574	605.0	58.2	20.3	16.0
B. F. Jones	do	1	5,744	552.0	56.2	20.2	16.0
Cutler Adams	do	1	3,768	497.0	52.1	19.0	15.0
Lackawanna	do	1	5,482	550.0	56.2	20.3	15.5
Erica (foreign)	Clay	1	914	(1)	(1)	15.5	15.5
Oris (foreign)	do	1	759	(1)	(1)	(1)	(1)
Signeborg (foreign)	do	1	705	(1)	(1)	(1)	(1)
Manicouagan (foreign)	do	1	1,158	(1)	(1)	(1)	(1)
MOTORS							
Velox	Fishing	208	3,120	[2] 41.0	11.2	5.0	(1)
Ewig	do	217	5,425	[2] 45.8	13.7	5.0	(1)
Outboard	do	118	118	(1)	(1)	1.0	(1)
Cathy	do	64	256	(1)	(1)	1.5	(1)
57–F–612	do	35	70	(1)	(1)	.5	(1)
Ida S.	do	256	9,216	[2] 52.0	14.5	5.5	(1)
Smith Brothers	do	220	6,380	[2] 48.6	14.2	5.3	(1)
37B464	do	12	12	(1)	(1)	1.0	(1)
John Roen, Jr.	Refuge	2	70	88.0	18.5	9.0	9.0
Total		1,179	245,210				

[1] Not available.
[2] Length between perpendiculars.

30. Table 7 contains a summarized record of the recreational boating at this harbor according to such Federal surveys and investigations as have been made in the past 11 years. No prior Federal surveys or investigations were undertaken and none were made for the years 1942–46, or for 1948 and 1949.

TABLE 7.—*Recreational boating, 1939–47* [1]

Calendar year	Vessel arrivals (number of trips) [2]			Passengers arriving [2]		
	Local	Visiting	Total	Local	Visiting	Total
1939	1,171	209	1,380	5,196	1,119	6,315
1940	1,757	235	1,992	6,352	1,286	7,638
1941	957	165	1,122	3,622	866	4,488
1947	772	[3] 197	969	2,644	1,025	3,669
Annual average	1,164	202	1,366	4,454	1,074	5,528

[1] Exclusive of outboard motorboats.
[2] Departures the same. The number of trips and passengers apply to round trips of local and visiting craft and are based on reports from about 85 percent of the owners.
[3] 28 trips with 136 passengers reported for refuge.

31. Table 8 shows the trips and drafts of recreational craft using Sheboygan Harbor during the calendar year 1947 according to the latest Government survey of that traffic on the Great Lakes.

TABLE 8.—*Trips and drafts of recreational vessels in 1947* [1]

Draft (feet)	Local		Cruising [2]		Visiting [3]				Total	
					Refuge		Other			
	Motor Vessels	Sailing Vessels	Motor Vessels	Sailing Vessels	Motor Vessels	Sailing Vessels	Motor Vessels	Sailing Vessels	Motor Vessels	Sailing Vessels
8 to 10	------	------	------	------	------	1	------	------	------	1
6 to 8	25	21	4	14	------	5	------	3	29	43
4 to 6	------	134	17	38	3	5	10	19	30	196
2 to 4	426	86	32	1	14	------	25	4	497	91
Under 2	25	55	------	2	------	------	------	------	25	57
Total	476	296	53	55	17	11	35	26	581	388
Passengers	1,646	998	317	274	82	54	163	135	2,208	1,461

[1] Arrivals; exclusive of outboard motorboats; departures substantially the same. The number of trips and passengers apply to round trips of local and visiting craft and are based on reports from about 85 percent of the owners. Sheboygan is the home port of about 27 of the vessels involved in the above traffic.
[2] Sheboygan was entered as a regular port of call on cruise.
[3] Sheboygan was visited only incidentally for refuge or other purposes.

DIFFICULTIES ATTENDING NAVIGATION

32. Marine interests contend that the present harbor-entrance depth is inadequate to safely absorb the scend of vessels entering the harbor in heavy seas at low lake levels. They also claim that greater depth is necessary in the inner portion of the entrance channel to admit fully loaded vessels to the coal wharves. Increased depth up to Pennsylvania Avenue Bridge is also desired by local business and marine interests to provide for the needs of present and prospective recreational and naval training craft as well as for prospective substantial amounts of new oil, stone and lumber business in large vessels.

WATER POWER AND OTHER SPECIAL SUBJECTS

33. This improvement for navigation does not involve present or prospective improvements for water power, flood control, municipal- or industrial-water supply, the control or conservation of water resources, abatement of pollution, wildlife, or land reclamation. The extent to which this harbor is used for recreational purposes is shown in paragraphs 30 and 31 above.

PLAN OF IMPROVEMENT

34. The accompanying map shows the general improvement plan found to be most practicable, economical, and needed for further improvement of this harbor. The general plan is subdivided into parts A, B, and C for brevity and convenience of identification in references, estimates, and further discussions. The considered improvements are needed in part to preserve the channel previously maintained by the city for the extensive coal business, which is about 98 percent of the present commerce of the port. The up-river portion of the improvement would also replace somewhat similar channels previously maintained by the city and this improvement is needed to accommodate the proposed substantial receipts of crude oil by vessels for a local refining plant, the receipts of lumber from Canada needed for the

extensive local furniture-manufacturing business, and the receipts of crushed stone for fertilizer and construction purposes. No general increase in the presently authorized depth of the outer harbor is proposed as the present project depth is the same as that of the largest harbors in this district, as well as that of the controlling up-bound channel between Lakes Erie and Huron. The existing project depth of 21 feet for part A is adequate for the present and prospective increased traffic in coal, oil, and stone and the proposed depth of 15 feet for part B above Maryland Avenue and Ninth Street would be adequate for the vessels passing the canals in the St. Lawrence River with their controlling depth of 14 feet over the sills of the locks.

35. The plan for further improvement of this harbor does not include the originally requested 28-foot depth at the harbor entrance or the 23-foot depth through the outer harbor entrance channel and up the river to the westerly end of the coal wharves. It also omits the originally requested 21-foot depth in the river above Maryland Avenue and Ninth Street. The above-mentioned features were eliminated after an engineer from this district held a conference at the city hall at Sheboygan on March 14, 1950, and showed city officials, marine, and local business interests, by maps and preliminary estimates, that such work is unnecessary and would serve no useful purpose at this time. Confirmation of these changes in the originally requested modifications of the project for this harbor is contained in letter dated March 14, 1950, from the mayor of Sheboygan, which has been added to the report of the public hearing. Accordingly, these features are not considered in this report except to the extent of their general discussion in the two succeeding paragraphs.

36. Those present at the conference were shown how former harbor entrance conditions have been improved since the vessel groundings of 1926 and 1934 by deepening the entrance from 22 to 25 feet in 1938 and also by deepening the channel in the outer harbor to 21 feet and widening it to 500 feet, along with providing a turning basin of 20-foot depth in the outer harbor, during the years 1928–31. They were also advised that the present project depth of 21 feet in the outer harbor is the same as that of the largest harbors in this district; that it is the same as that of the up-bound channel in Detroit River, which controls the loaded draft of up-bound coal vessels handling about 75 to 90 percent of the traffic of the harbor; that the present project depth of 21 feet is adequate for the prospective oil business at Sheboygan; and that it is also adequate for the prospective crushed-stone business, which would be handled over a wharf just above the Eighth Street Bridge via a requested channel of only 21-foot depth from the coal wharves to its upper end. The present controlling depth at the rail-lake loading wharf at Calumet River, Ill., where some coal is transferred from cars to vessels for the delivery to Sheboygan, is the same or a little less than the 21-foot project depth at Sheboygan. Hence the project depth at Sheboygan is also adequate for such coal as is received from Calumet Harbor.

37. The conference discussion of the prospective primary use of Sheboygan River above Maryland Avenue and Ninth Street for the receipt of lumber from eastern Canadian sources made it clear that the maximum loaded draft for such vessels would be the 14 feet now available over the lock sills of the canals along the St. Lawrence

River. As there is no reasonably prospective traffic of greater draft for this portion of the river, it was agreed that a channel depth of 15 feet would cover present and reasonably prospective needs for this portion of the river and that such traffic would not need a channel upstream of the north side of Jefferson Avenue. Consequently, the originally requested channel depth of 21 feet in this portion of the river was reduced to 15 feet, as stated in the above-mentioned letter of March 14, 1950, from the mayor of Sheboygan.

38. Part A of the general improvement plan considered in this report is shown in outline and sections on the map. This part provides for a channel of 21-foot depth extending upriver from the inner end of the existing Federal project channel near the river mouth to the south side of Maryland Avenue at Ninth Street. This channel would be of adequate widths to accommodate all coal traffic of the harbor as well as the prospective crude-oil traffic in oil tankers and also the prospective crushed-stone traffic in as large vessels as can pass through the existing Eighth Street Bridge. It would be quite similar to the channel previously maintained by the city and would not require the acquisition of any land as it would all be within the existing, revetted channel limits. It would be within the built-up portion of the city, so nearby disposal of dredged materials would be impracticable. However, it would be necessary to lower a city submarine water-main crossing of the river at New Jersey Avenue between Sixth and Seventh Streets in order to provide full project depth over the new crossing. No modification of the bulkheads along this portion of the channel is considered necessary. Other local cooperation items are discussed in further detail under the caption "Local cooperation."

39. Part B of the general improvement plan considered herein is also shown on the map in outline and cross sections. It provides for a channel generally 100 feet wide and 15 feet deep from the south side of Maryland Avenue at Ninth Street upriver to the north side of Jefferson Avenue, the upper end being one block directly downstream from the drawspan in Pennsylvania Avenue Bridge. This channel would be adequate for the 14-foot-draft vessels now proposed for more economical delivery of lumber via the St. Lawrence River system from the only presently available sources of supply in eastern Canada. If so desired it would also pass the canal boats now delivering china clay over a wharf just upstream from the large coal wharf, where coal dust is an objectionable factor. This channel would be quite similar to the one maintained by the city in earlier years for the receipt of lumber in small lake vessels, when they were available and a suitable lumber supply was available from various lake ports. The channel would be in the river along a revetted channel through a manufacturing district so no land acquisition would be involved and the nearby disposal of dredged materials would be impracticable. No modification of the bulkheads along this portion of the channel is considered necessary.

40. Part C of the general improvement plan considered herein also is shown on the map. It provides for an increase in the project width at the entrance channel at the lakeward end of the breakwater from 400 feet to about 450 feet, at 25-foot depth. This would correspond with the overwidth dredging which has been necessary for several years to allow for the free movement of vessels and which has been

accomplished under authority of the River and Harbor Act approved March 4, 1915. Part C provides also that the area at the lakeward end of the entrance channel having a project depth of 25 feet be extended shoreward about 200 feet and the area in which the project depth decreases from 25 to 21 feet be moved about 200 feet shoreward. These minor modifications will provide increased safety to vessels using this harbor.

41. A turning basin at the upper end of the proposed project improvement was not requested by local interests and is not considered necessary at this time. No tug service is available at Sheboygan Harbor at the present time. Assistance in maneuvering vessels could be obtained from Manitowoc where one of the tugs operated by the C. Reiss Coal Co. is usually based to provide 24-hour service during the navigation season. Such "Local cooperation" as would be involved for the improvements under consideration is discussed under that caption later in this report.

SHORE LINE CHANGES

42. The improvements considered in this report involve only dredging within the river and the protection of the existing harbor structures, so it would have no effect on the shore line of Lake Michigan.

43. The preponderance of material impounded by the north breakwater and the several groins along the north beach indicate that the predominating littoral drift is north to south. Although the prevailing winds are in the same general direction, southeast, south, and southwest winds are of greater occurrence and of about equal intensity from July through November. It is chiefly during this period when the waves cause material from the relatively shoal area southerly of the south breakwater to be transported northward into the entrance channel abreast of the north breakwater.

ESTIMATES OF FIRST COST

44. The estimated first cost, including contingencies, engineering, inspection, and overhead, for the parts of the general plan described under "Plan of improvement," and as shown on the map, are as follows:

Item No.	Item	Amount
	PART A	
1	Dredge channel to 21-foot depth in river from the inner end of the existing Federal project channel to south side of Maryland Ave. at 9th St., as shown on map, 110,000 cubic yards, place measurement, at $1.10 per cubic yard	$121,000
2	City of Sheboygan to remove existing and install new 16-inch water-main crossing of the river at New Jersey Ave. downstream from 8th St. at about 30-foot depth	75,000
3	Total cost of part A	196,000
	PART B	
1	Dredge channel to 15-foot depth in river from south side of Maryland Ave. at 9th St. to the north side of Jefferson Ave., as shown on map, 46,000 cubic yards, place measurement, at $1.10 per cubic yard	50,600
	PART C	
1	Minor widening and deepening of the harbor entrance, as shown on the map, 25,000 cubic yards, place measurement, at $1.10 per cubic yard	27,500
	SUMMARY	
1	Total cost of recommended part A of plan	196,000
2	Total cost of recommended part B of plan	50,600
3	Total cost of recommended part C of plan	27,500
4	Total cost of recommended plan	274,100

ESTIMATES OF ANNUAL CHARGES

45. The estimated economic costs of the parts of the recommended improvement plan are shown below, divided between Federal and non-Federal investment according to the local cooperation prescribed herein.

	Part A	Part B	Part C	Total plan
(*a*) Federal investment:				
1. Estimated expenditure (first cost) by the United States for dredging	$121,000	$50,600	$27,500	$199,100
(*b*) Federal annual charges:				
1. Interest at 3 percent on Federal investment	3,630	1,520	820	5,970
2. Amortization on 50-year basis—0.887 percent of Federal investment	1,070	450	250	1,770
3. Increase in maintenance dredging	6,300	2,030	----------	8,330
4. Total Federal annual charges	11,000	4,000	1,070	16,070
(*c*) Non-Federal first cost:				
1. Estimated cost of lowering water main	75,000	----------	----------	75,000
(*d*) Non-Federal annual charges:				
1. Interest at 3½ percent on non-Federal investment	2,630	----------	----------	2,630
2. Amortization on 50-year basis: 0.763 percent of non-Federal investment	570	----------	----------	570
3. Total non-Federal annual charges	3,200	----------	----------	3,200
(*e*) Summary of annual charges:				
Federal	11,000	4,000	1,070	16,070
Non-Federal	3,200	----------	----------	3,200
Total	14,200	4,000	1,070	19,270

ESTIMATES OF BENEFITS

46. The estimated principal tangible benefits which would result from each part of the plan of improvement are enumerated below. In addition to the benefits described in detail there would also be incidental benefits to commercial fishing, recreational traffic, the Naval Reserve training program, and other prospective commerce. The incidental benefits are not itemized because they would be relatively small compared to the total benefits of the proposed principal traffic, which would require the controlling channel dimensions and which alone are sufficient to justify each part of the improvement plan. In addition to the tangible benefits there would also be such intangible benefits as increased safety and reduced delays and damages from operation of both large and small vessels in the former variable and uncertain channels.

47. Part A of the improvement plan would provide for the proposed vessel delivery of crude oil in vessels for the Sheboygan refining plant and also for the delivery of crushed stone for construction and fertilizer purposes.

(*a*) The prospective new water-borne commerce in crude oil results from the necessity for the Wisconsin Oil Refining Co. to commence receiving their supply of crude oil via vessel because of inadequate sources of supply for rail delivery to the plant. The amount of crude oil used by this refinery for the past 9 years is 168,000 tons annually. The anticipated future water-borne receipts of this commodity, at least equal to the past requirements, is considered by the district engineer to be reasonable. The refining company proposes to obtain suitable dock facilities and to install the necessary pipeline, pumping equipment, and storage tanks so that crude oil can be delivered to the plant via the harbor in 1951. Temporary use of the limited deep-water frontage in the harbor is proposed for mooring and unloading tankers until more deep water can be made available for deep-draft vessels to use wharfage upstream from the coal wharfs and not interfere with the coal traffic. A depth of 19 feet has been available on an average basis in the inner harbor at Sheboygan. With this depth available, the cost of transportation of crude oil from source to Sheboygan is assumed to be less by a method utilizing water movement from the Chicago area to Sheboygan than by all rail. Therefore, the benefits to be credited to the proposed deepening of the inner harbor to 21 feet is assumed to be the reduction in transportation cost of the prospective commerce in crude oil by use of the depth of 21 feet as compared to a depth of 19 feet. With a depth of 19 feet partially loaded tankers with maximum capacity of 4,500 tons could serve this proposed new commerce. By providing a depth of 21 feet fully loaded tankers of 6,000 tons capacity could be used. In order to deliver the prior average receipt of 1,000,000 barrels, or 168,000 tons, per year, 28 trips by the fully loaded vessels or 37 trips by partially loaded vessels would be required. Thus a saving of nine vessel trips could be effected if the improvement were made and utilized by the fully loaded vessels. Based on an average round trip operative cost from the Chicago area of $2,100 per vessel, exclusive of loading and unloading, the annual economic benefit would amount to about $18,900. Tankers engaged in this service ordinarily could reach their destination just below the Eighth Street Bridge unassisted. However, these vessels would need

tug service in backing out of the channel. This service is estimated to cost $200 per trip, or $1,800 per year for the nine vessel trips saved by the proposed channel deepening. The total saving in transportation cost is, therefore, $20,700.

(*b*) The need for construction materials and the recently increased use of crushed limestone for fertilizer purposes in this area has resulted in a demand for the anticipated new water-borne commerce at Sheboygan for crushed limestone. Because of the limited dock space available and the difficulties of scheduling and handling both limestone and coal shipments over the same dock facilities, this business has not developed to the extent the demand would justify. The coal dock will be used still more extensively when the new power plant unit mentioned in paragraph 27 starts operations. If an adequate channel is provided, the C. Reiss Coal Co. proposes to deliver annually in deep-draft vessels to their dock just above Eighth Street from their Drummond Island quarries about 100,000 tons of crushed limestone for the above purposes. According to supplementary oral information this would be about 50,000 tons of crushed stone and 25,000 tons of fertilizer the first year and it is expected that these amounts would double over a period of years. The estimated result would be an annual average of about 65,000 tons of crushed stone and 35,000 tons of fertilizer. If the city had maintained a depth of 19 feet about to Eighth Street as it had done in the past, vessels of the self-unloader type would have been able to proceed to the docks just above Eighth Street with their cargo. As the vessels draw from 20.3 to 20.8 feet when fully loaded, the availability of only 19-foot depth in the channel would have resulted in the vessels being loaded about 12 percent less than their capacity. Based on an estimated receipt of 100,000 tons and a vessel capacity when fully loaded of 8,500 tons, 13 trips would have been required by the vessels if the channel depth were 19 feet. However, if the proposed deepening to 21 feet is provided, the same tonnage could be delivered by 12 trips, or a saving of 1 vessel trip per year. The average operating cost from Drummond Island, exclusive of loading and unloading, is about $4,400 per trip. The large self-unloading vessels engaged in this commerce would need tug assistance to reach the dock just above the Eighth Street Bridge and in backing out of the channel. Tug service is estimated to cost $200 per tow or $400 per round trip from the harbor entrance. The annual savings in the prospective transportation of stone is therefore, $4,800.

(*c*) Coal commerce at Sheboygan Harbor utilizes a portion of the inner harbor just upstream from the Federal project. Local interests have maintained this portion of the project to a depth of about 21 feet. Assumption of this maintenance dredging by the United States would result in unevaluated benefits and is in agreement with the general policy for Federal navigation projects to include the inner harbor channels where diversified and substantial commerce is involved.

(*d*) The total estimated average annual tangible benefits credited to part A of the general plan is about $25,500.

48. Part B of the improvement plan would provide primarily for the proposed receipt of lumber for the local needs of furniture manufacturers. A representative of the local furniture manufacturers indicated that the total annual requirements of all furniture plants would be about 12,000 tons of lumber to be delivered by vessel from Canadian sources. This estimate of prospective lumber traffic appears reason-

able. Under present channel conditions lumber consigned to the furniture plants above Maryland Avenue would necessitate unloading on the Reiss dock and rehandling by truck to the plants. It is estimated that the increased handling and transportation charges would be $1.25 per ton. This added cost would be eliminated by the proposed upstream channel extension which would permit the lumber vessels to deliver direct to the plants. Applying this saving of $1.25 per ton to 12,000 tons of lumber would result in an annual saving of about $15,000. Vessels engaged in this service are relatively small, being about 250 feet in length with loaded maximum draft of 14 feet. Such vessels can reach their destination to the lumber docks above Eighth Street without tug assistance but would need tug service in backing out. This service is estimated to cost $250 per trip or $3,000 per year for an estimated 12 trips required to transport 12,000 tons of lumber annually. Deducting this from the above estimated savings of $15,000 leaves a net annual economic benefit of about $12,000.

49. Part C of the improvement plan would afford safer entrance conditions by providing adequate depth under vessels for an additional 200 feet shoreward of the outer end of the south pier and would reduce seasonal shoaling within the present entrance by providing a settling basin for the drift sand outside the present project channel limit. The added safety as a result of this improvement is considered more than sufficient to justify the cost.

COMPARISON OF BENEFITS AND COSTS

50. The following is a summarization of the above-estimated annual costs of the parts of the improvement plan compared to the estimated benefits which would result from each part of the plan:

Plan	Total annual charges	Total annual benefits	Benefit-cost ratio
Part A	$14,200	$25,500	1.8:1
Part B	4,000	12,000	3.0:1
Part C	1,070		
Total, parts A, B, and C	19,270	37,500	1.9:1

PROPOSED LOCAL COOPERATION

51. In consideration of the local benefits to be derived from further improvement of this harbor local interests should cooperate to the extent of paying all costs of necessary adaptations of existing private structures, including submarine and overhead crossings, to the proposed channel dimensions in the river. Available information indicates that this will require only the lowering of an existing city submarine water-main crossing of the river at New Jersey Avenue. Although the highway bridge at Eighth Street crosses a pronounced bend in the river no widening of the drawspan is considered in this report. All municipal bridge hours, which had applied to this and other highway bridges across the river, were eliminated by a city ordinance passed in December 1949 so there are now no restrictions to opening bridges promptly upon signals from vessels. No disposal

areas for new work or maintenance dredging are involved as all work is through the fully developed portion of the city and all dredging must be done by hopper, dipper, or bucket types of dredges. As the proposed dredging would be in revetted portions of a narrow river, local interests also should hold and save the United States free from damages and claims of damage which may arise from the original and maintenance dredging of such channels as are included in the authorized improvement plan. Their attitude on compliance is favorable, as stated in letter referred to in paragraph 24 above and as further stated in resolution adopted by the Sheboygan City Council on September 7, 1950, copy of which is attached to this report as appendix I.[1] Local interests also should give assurance that an adequate area will be made available to locate the transfer facilities required for unloading bulk petroleum tankers as the estimated savings in the transportation cost of crude oil cannot be realized unless such facilities are available. A representative of the city stated that this condition appears reasonable and that the city probably would comply.

ALLOCATION OF COSTS

52. The allocation of first and annual maintenance costs of the parts of the improvement are summarized below:

	First cost				Average annual maintenance cost			
	Part A	Part B	Part C	Total, A, B, and C	Part A	Part B	Part C	Total, A, B, and C
Cost to—								
United States	$121,000	$50,600	$27,500	$199,100	$6,300	$2,030	-------	$8,330
Local interests	75,000	-------	-------	75,000	-------	-------	-------	-------
Total	196,000	50,600	27,500	274,100	6,300	2,030	-------	8,330

Total funds required by the United States for parts A, B, and C are $199,100.

COORDINATION WITH OTHER AGENCIES

53. The desired harbor improvements listed in paragraph 22 of this report have been the subject of consultations, discussions, and correspondence between the district engineer and his representatives and the mayor, aldermen, and other city of Sheboygan officials and also the owners of local marine terminals and water frontage along the river. Formal consideration of the original request for a deeper harbor entrance and entrance channel through the outer harbor and in the river along the coal wharves was eliminated at the conference on March 14, 1950, described in paragraph 35. Their original request for a 21-foot channel to Pennsylvania Avenue Bridge was changed at the same conference to a channel having a depth of 15 feet from the south side of Maryland Avenue at Ninth Street to the north side of Jefferson Avenue. City officials and all other local interests at that conference were satisfied with the two parts of the lesser-improvement plan considered herein, as is indicated by the modified improvement request in the mayor's letter of March 14, 1950, referred to in paragraph 35.

[1] Not printed.

54. In accordance with section 1 (a) of the River and Harbor Act approved March 2, 1945, the designated representative of the State for river and harbor improvements was advised of the nature of this report in letter from this office dated August 24, 1950, and was requested to submit such comments as desired. In letter dated September 11, 1950, to the district engineer he concurs in the proposed plan for further improvement of Sheboygan Harbor. This letter is attached to this report as appendix II.[1] Notices of the public hearing were sent to all prescribed Federal and State agencies but only the State director of regional planning, who is also the Governor's designated representative of the State for river and harbor improvements, appeared at the public hearing at Sheboygan. He presented a written statement (exhibit No. 7 [1] of the report of public hearing) favoring the improvement requested by local interests. A letter dated November 21, 1949, from the office of the Secretary of the Department of the Interior, Washington, D. C., and another dated December 7, 1949, from the Fish and Wildlife Service, Department of the Interior, Minneapolis, Minn. (exhibit Nos. 21 [1] and 22 [1] of the report of the public hearing), express no interest in this project. No other State or Federal agencies have expressed any interest in further improvement of this harbor, but the supervisor of commercial fishing, fish management division, Conservation Department of Wisconsin, reported the amount of fish caught in 1948 at Sheboygan Harbor in a letter dated December 13, 1949, which is exhibit No. 1 [1] of the minutes of the public hearing.

DISCUSSION

55. The loaded drafts of vessels using Sheboygan Harbor in 1949, as shown in table 6, paragraph 29, did not exceed 20.7 feet even though the lake level during that navigation season reached about 1.3 feet above datum and would have permitted a loaded draft of at least 22 feet with about one-half foot under the keels of vessels in Sheboygan Harbor. This indicates that the present controls on loaded draft in the up-bound channel of Detroit River and at the loading wharf of the car to vessel transfer at Calumet Harbor, Ill., all as described in detail in paragraph 36 above, as well as the load-line drafts of vessels, are the factors which limit the loaded draft of vessels rather than the project depth of 21 feet at this and all other larger harbors in this district. Experience at the largest harbors in the district shows that a project depth of 21 feet is ample for the coal, oil, and stone business at the present time, irrespective of the stages of Lake Michigan. Past experience has also shown that the present 25-foot project depth of the harbor entrance is also reasonably adequate for safe entry into this harbor during major storms. However, the entrance channel width abreast of and inside the end of the breakwater has been found to be too narrow to allow for the rather pronounced shoaling which results along its south side during the navigation season and still leave ample width for safe entry in fall storms. Consequently it has become necessary to dredge somewhat outside the south channel limit under authority of the River and Harbor Act of March 4, 1915, to provide a settling basin for the drift sand and thereby reduce the seasonal encroachment upon a safe entrance width.

[1] Not printed.

It is considered a better and safer procedure to include this overwidth dredging in the project limits, as shown on the map, in order to insure that it will be maintained and thereby provide a somewhat safer entrance for large vessels in major storms. Under the existing project the reduction in dredging depth from the depth of 25 feet provided at the entrance to the depth of 21 feet in the entrance channel along the south side of the turning basin is accomplished in a distance of 300 feet commencing 50 feet lakeward of the end of the south pier. Wave action at the entrance caused by storms from the southeast is not materially reduced until a position in the entrance channel at least 150 feet shoreward of the lakeward end of the south pier is reached. To insure adequate depth under vessels plunging in a sea when entering during southeast storms, it is considered desirable to extend the depth of 25 feet provided at the entrance 200 feet farther shoreward, as shown on the map. Recommendations to effect these minor changes in the entrance channel in the interest of increased safety are included in paragraph 62.

56. The proposal to deliver crude oil via this harbor for the local refining plant appears to be a necessity for continued operation of the refining plant and is in line with the well-established practice of obtaining the lowest costs of transportation by moving bulk commodities by vessel as far as practicable. Continued operation of this refinery is not only in the public interest as an economic source of supply in this general vicinity, but it has been and will no doubt continue to be a dependable and economical source of supply for oil-burning floating plant, engaged in maintenance dredging and repairs of many harbors, especially those within economical trucking distances for deliveries from the refinery. The reduced costs of transportation of raw materials via the improved harbor will be an advantage which should insure not only continued operation of the refinery but also an increase in its capacity. Continued operation of this plant will result in many direct and indirect benefits and economic advantages to the general public, marine interests, and the United States in the form of reduced costs for harbor maintenance and construction in this district, particularly in the general vicinity of the plant.

57. The prospective development of new water-borne commerce from Drummond Island of about 100,000 tons of crushed limestone annually for farm fertilizer and construction purposes appears to have merit. This stone has a liming ratio about one-third greater than required by the Department of Agriculture and the State of Wisconsin and about the same amount greater than such crushed limestone as is now available in the general vicinity of Sheboygan. This superior liming value should create a new market for this fertilizer in addition to the present rather limited local supply. As there is a similar demand for crushed stone in this general locality for use in highway and general construction the development of a new market for this type of stone appears reasonable.

58. The proposed receipt of lumber by vessel from eastern Canada for local manufacturing purposes would amount to revival of the vessel lumber business which vanished from Sheboygan Harbor and all other harbors in this district along with depletion of the local lumber supply. There has been no such revival of the lumber business from Canada at any other harbor in this district although there is similar local need

for the receipt of similar lumber for furniture and other manufacturing purposes. However, it appears that the Sheboygan manufacturers definitely proposed to be pioneers in the reinstatement of their former lumber business by vessel in lieu of the present method of all rail. In 1949 they contracted for a cargo of Canadian lumber to be delivered by vessel in the present deep-water area of the harbor even though it would have required double handling and trucking to the plants under present channel conditions. Although that contract was canceled by the vessel operator, due to lateness in the navigation season and actual delivery of lumber did not materialize in 1949, the present inadequate local-supply situation indicates that prospective commerce of about 12,000 tons would be delivered by vessel on the docks adjacent to most of the furniture plants if an adequate channel were available. Present difficulties encountered in scheduling vessels and the inability of local furniture manufacturers to agree on a common source of supply in order to pool their requirements to obtain the lowest rate are expected to be solved. As shown in paragraph 48 above, the estimated lumber receipts are sufficient to justify the relatively small cost of the necessary channel, without allowance for any incidental additional benefits to recreational traffic, the china clay business, or such additional commerce as may develop.

59. The city of Sheboygan has dredged and maintained the lower 1.5 miles of Sheboygan River at various depths in 21 of the years from 1895 to 1946, inclusive. This was done at a reported total cost of about $217,000 for the removal of about 1,000,000 cubic yards of generally soft material. Dredging above Pennsylvania Avenue was discontinued in 1910 due to cessation of receipt of lumber from nearby sources. In recent years the dredging has been done primarily in the lower reaches for the benefit of the coal traffic. The last municipal dredging of the inner harbor was done in 1946, at a cost of $89,500 for the removal of 201,568 cubic yards. In addition the city and county provided funds for the original improvement of the river's mouth, as is explained in detail in paragraphs 13 and 16 above. The above-described expenditures by the city for improvement of this river are considered to be a liberal amount of voluntary local cooperation. It has become more and more difficult for the city of Sheboygan, like practically all other cities in this district, to finance the cost of dredging the river. The district engineer considers that assumption of maintenance of the inner harbor at Sheboygan is in accord with the current policy of the United States to provide work of this nature at harbors having diversified and substantial commerce.

60. Although much of the direct benefits of the entire improvement would be local the indirect benefits would be widespread to the numerous ultimate consumers of the manufactured products involved. As an over-all matter the proposed improvement is considered to be in the general public interest. The plan has been examined by city officials, property and marine interests, including the Lake Carriers' Association, who are primarily concerned, and all have expressed their satisfaction in general with the depths, widths, and limits of the proposed river channels.

CONCLUSION

61. The city has cooperated very liberally in the past improvement and maintenance of channels in Sheboygan River but now seeks relief from this expense which is now largely for general public benefit. It is considered to be in the public interest in this case for the United States to provide such improvements. Part A of the improvement plan considered herein is found to be suitable for the long established coal business of this harbor and also adequate and necessary to serve the proposed new crude oil and crushed stone business. Part B of the plan also is adequate and necessary to serve the proposed vessel receipts of Canadian lumber for manufacturing purposes. Part C is necessary to make navigation free and safe at the harbor entrance. All parts of the plan would serve the needs of local and visiting recreational craft. Local interests agree to comply with the local cooperation requirements described under that caption. The total estimated first cost to the United States for part A of the plan is $121,000, for part B $50,600, and for part C $27,500; making a total of $199,100. All of the funds should be made available in one allotment as parts A and B of the plan are of about equal importance and part B would not be of practical value without completion of at least a 15-foot channel through the entire channel included in part A. All of the dredging can be done in 1 year and should be done under one contract in order to obtain the lowest unit cost for the dredging.

RECOMMENDATION

62. It is recommended that the existing project for Sheboygan Harbor, Wis., be modified to provide for an inner harbor channel extending upstream to the south side of Maryland Avenue at Ninth Street with a depth of 21 feet and thence upstream to the north side of Jefferson Avenue with a depth of 15 feet and with widths generally as shown on the accompanying map and not closer than 25 feet to bulkheads, and with an increase in width and depth at the harbor entrance channel as shown on the accompanying map; all at an estimated total first cost to the United States of $199,100, with an increased cost of annual maintenance of $8,330. It is further recommended that undertaking the inner harbor improvement be subject to the condition that local interests give assurances satisfactory to the Secretary of the Army that they will—

(*a*) Hold and save the United States free from property damages that might result from the construction and maintenance of the project.

(*b*) Make necessary changes in the existing water main crossing the river between Sixth and Seventh Streets.

(*c*) Make available an adequate area to locate the transfer facilities required for unloading bulk petroleum carriers.

D. A. MORRIS,
Colonel, Corps of Engineers,
District Engineer.

[First endorsement]

CORPS OF ENGINEERS,
GREAT LAKES DIVISION,
OFFICE OF DIVISION ENGINEER,
Chicago 15, Ill., December 29, 1950.

Subject: Reveiw Report on Surveys of Sheboygan Harbor, Wis.
To: Chief of Engineers, United States Army, Washington 25, D. C.

The recommendation of the district engineer is concurred in.

JOHN R. HARDIN,
Colonel, Corps of Engineers,
Division Engineer.

LIST OF ILLUSTRATIONS MADE IN CONNECTION WITH THE REPORT OF THE DISTRICT ENGINEER

(Only File No. 2–I–12 printed)

Sheboygan Harbor, Wis. (file No. 2–I–12).
Commerce flow chart (file No. 6–C–191).

LIST OF APPENDIXES MADE IN CONNECTION WITH THE REPORT OF THE DISTRICT ENGINEER

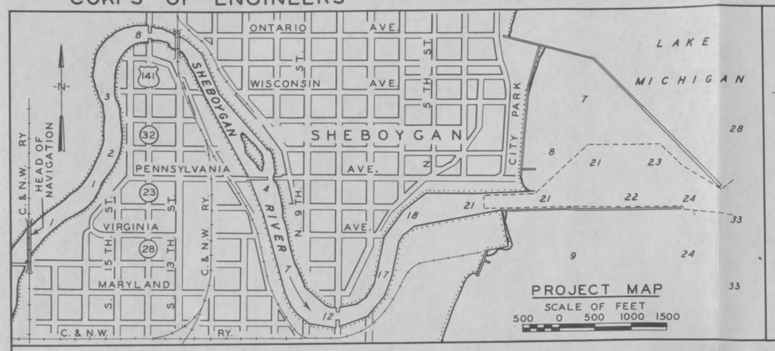
(Not printed)

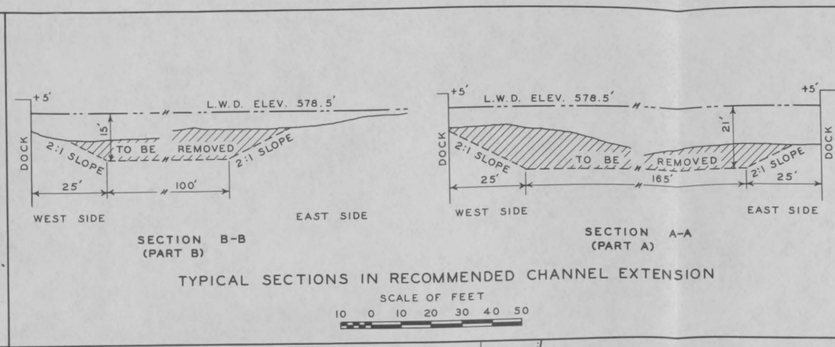
I. Sheboygan City Council resolution.
II. Letter from Wisconsin State Planning Board.
III. Estimate of first cost of improvements.

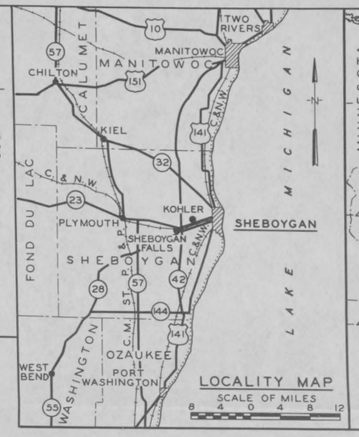
○

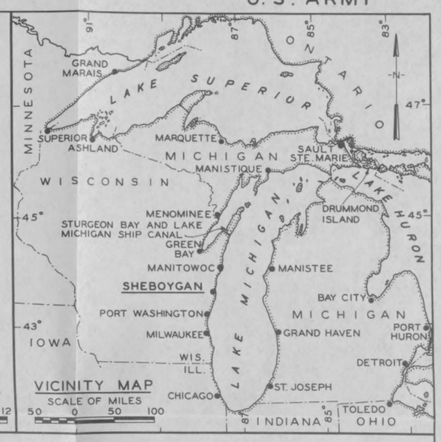
CORPS OF ENGINEERS

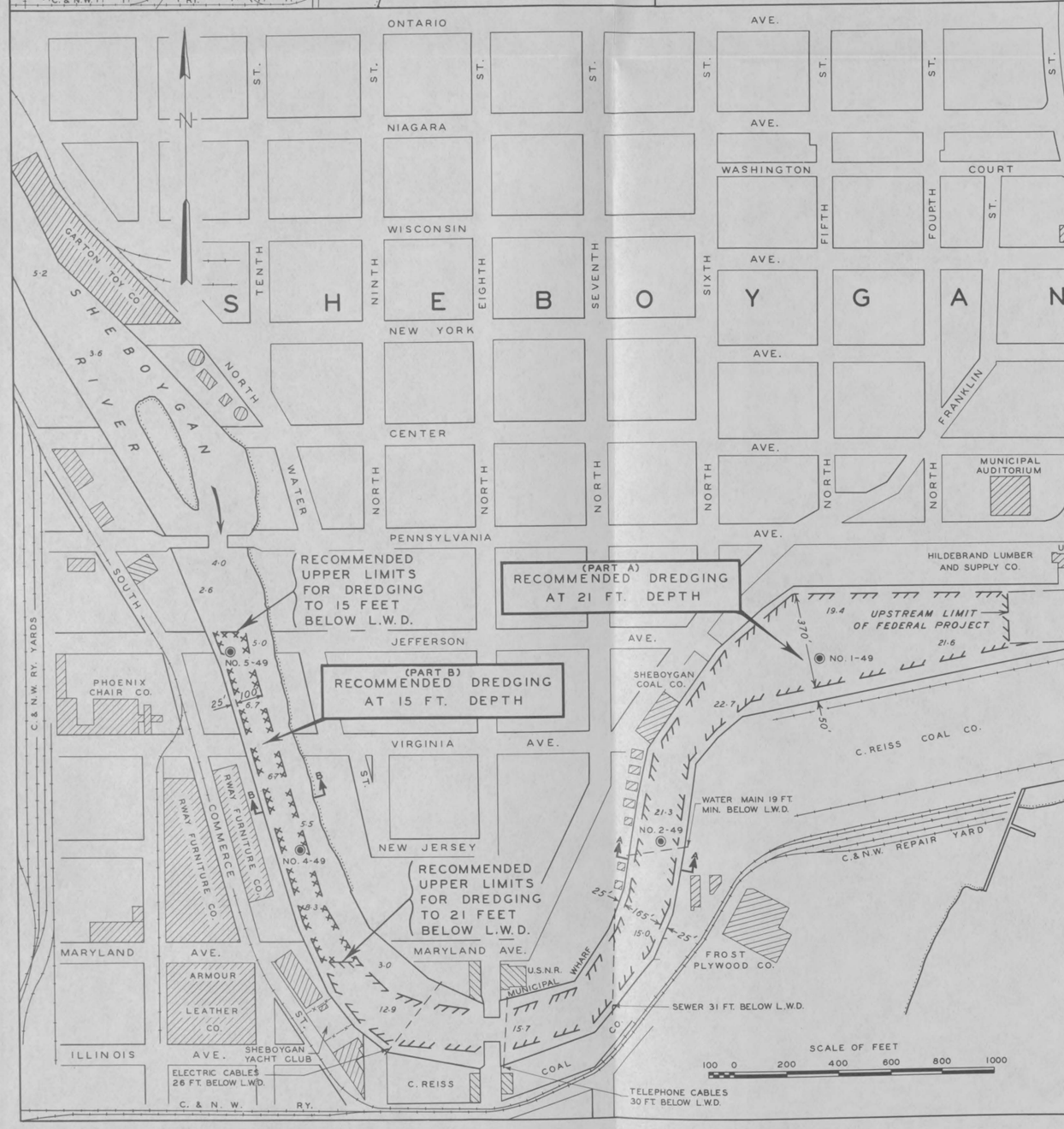
U. S. ARMY

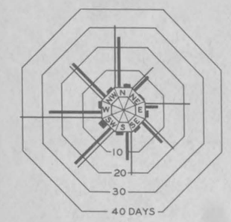












LEGEND

MILES PER HOUR	FORCE BEAUFORT SCALE
0 TO 12	0, 1, 2 & 3
OVER 12 TO 24	4 & 5
OVER 24	6 & OVER

WIND DATA FROM U.S. WEATHER BUREAU, MILWAUKEE, WISCONSIN, 1 JANUARY 1929 TO 31 DECEMBER 1943, INCLUSIVE. NO WIND DATA AVAILABLE AT SHEBOYGAN, WISCONSIN.

WIND CHART

LEGEND

SOUNDINGS 22, 7.6
BORINGS ◉ NO.2-49
RECOMMENDED DREDGING LIMITS
TO 21 FT. /// /// ///
TO 15 FT. XXX XXX XXX
LIMIT OF EXISTING PROJECT ——— ———
LIMIT OF RECOMMENDED PROJECT – – – – –
RECOMMENDED CHANGES IN CHANNEL LINES —·—·—·—·—

NOTES

MAP PREPARED FROM DATA ON FILE IN THIS OFFICE, SUPPLEMENTED BY HYDROGRAPHIC AND TOPOGRAPHIC SURVEY IN 17-22 NOVEMBER 1949.
SOUNDINGS AND BORINGS ARE IN FEET AND ARE REFERRED TO LOW WATER DATUM WHICH IS 578.5 FEET ABOVE MEAN TIDE AT NEW YORK.

RECORD OF BORINGS

BORING NUMBER	DEPTH OF WATER, FEET	MAXIMUM DEPTH OF PENETRATION, FEET	OVERLYING MATERIAL	MATERIALS AT MAXIMUM DEPTH
NO. 1-36	23.8	40.0	SILT, SAND, CLAY AND GRAVEL	SAND
NO. 1-49	17.9	29.8	PEAT, MARL, CLAY AND GRAVEL	GRAVEL
NO. 2-49	20.9	36.7	PEAT, MARL, CLAY, SAND AND GRAVEL	SAND AND GRAVEL
NO. 4-49	6.8	36.1	PEAT, MARL, SANDY GRAVEL AND CLAY	CLAY
NO. 5-49	5.1	31.5	SILT AND SANDY GRAVEL	SANDY GRAVEL

SHEBOYGAN HARBOR WISCONSIN

IN 1 SHEET — SCALES AS SHOWN

MILWAUKEE, WIS. DISTRICT, 6 SEPTEMBER 1950

SUBMITTED: APPROVAL RECOMMENDED: APPROVED:

CHIEF, PLANNING AND REPORTS BRANCH — CHIEF, ENGINEERING DIVISION — COL., CORPS OF ENGINEERS DISTRICT ENGINEER

DRAWN: W.L.
TRACED: W.L.
CHECKED: G.B.W.

TO ACCOMPANY REVIEW REPORT ON SURVEYS DATED: 8 DECEMBER 1950

FILE NO. 2-I-12

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